

Docket No. AT9-99-073

**CLAIMS:**

What is claimed is:

- 5 1. A method of monitoring events within a data processing system comprising a speculative processor and a plurality of counters, wherein each counter among said plurality of counters counts occurrences of specified events within the data processing system, the method
- 10 comprising:
- specifying an event to be monitored;
- monitoring for the specified event during the execution of instructions by the speculative processor;
- generating a count of occurrences of the specified
- 15 event for all instructions executed by the speculative processor; and
- generating a count of occurrences of the specified event for instructions completely executed by the speculative processor.
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2. The method of 1 further comprising:
- computing a difference between the count of occurrences of the specified event for all instructions and the count of occurrences of the specified event for
- 25 all completed instructions as a count of occurrences of the specified event for instructions speculatively executed by the speculative processor.
3. The method of 1 further comprising:
- 30 monitoring a plurality of specified events for each instruction executed by the speculative processor.

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4. A method of monitoring events within a data processing system comprising a speculative processor and a plurality of counters, wherein each counter among said plurality of counters counts occurrences of specified events within the data processing system, the method comprising:

- associating an interim counter with a particular instruction;
- 10 associating a first global event counter with all instructions;
- associating a second global event counter with completed instructions;
- specifying an event to be monitored;
- 15 monitoring for the specified event during execution of instructions by the speculative processor;
- in response to detecting an occurrence of the event during execution of the particular instruction, incrementing the interim counter;
- 20 in response to detecting an occurrence of the event during execution of any instruction, incrementing the first global counter; and
- in response to detecting a completion of the particular instruction, adding event counts from the interim counter to the second global event counter.
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5. The method of 4 further comprising:

- computing a difference between event counts from the first global event counter and event counts from the second global event counter as a count of occurrences of the specified event for instructions speculatively
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executed by the speculative processor.

6. A method of computing a count of events within a data processing system comprising a speculative processor and a plurality of counters, wherein each counter among said plurality of counters counts occurrences of specified events within the data processing system, the method comprising:

reading from a first counter a count of occurrences of a specified event for all instructions executed by the speculative processor;

reading from a second counter a count of occurrences of the specified event for instructions completely executed by the speculative processor; and

computing a difference between the count of occurrences of the specified event for all instructions and the count of occurrences of the specified event for all completed instructions as a count of occurrences of the specified event for instructions speculatively executed by the speculative processor.

7. A method of monitoring events within a data processing system comprising a speculative processor and a plurality of counters, wherein each counter among said plurality of counters counts occurrences of specified events within the data processing system, the method comprising:

specifying events to be monitored;

monitoring said specified events;

in response to detecting an occurrence of a particular specified event, incrementing a first counter

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and a second counter; and

in response to detecting a completion of an instruction, adding the second counter to a third counter.

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8. The method of 7 wherein the first counter counts occurrences of a particular specified event for all instructions executed by the speculative processor.

10 9. The method of 7 wherein the second counter counts occurrences of a particular specified event for a particular instruction.

15 10. The method of 7 wherein the third counter counts occurrences of a particular specified event for instructions completely executed by the speculative processor.

20 11. The method of 7 further comprising:  
computing a difference between the first counter and the third counter to generate a count of occurrences of a particular specified event for speculatively executed instructions.

25 12. An apparatus for monitoring events within a data processing system comprising a speculative processor and a plurality of counters, wherein each counter among said plurality of counters counts occurrences of specified events within the data processing system, the apparatus  
30 comprising:

means for specifying an event to be monitored;

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means for monitoring for the specified event during the execution of instructions by the speculative processor;

first means for generating a count of occurrences of the specified event for all instructions executed by the speculative processor; and

second means for generating a count of occurrences of the specified event for instructions completely executed by the speculative processor.

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13. The apparatus of 12 further comprising:

means for computing a difference between the count of occurrences of the specified event for all instructions and the count of occurrences of the specified event for all completed instructions as a count of occurrences of the specified event for instructions speculatively executed by the speculative processor.

14. The method of 12 further comprising:

means for monitoring a plurality of specified events for each instruction executed by the speculative processor.

15. A system for computing a count of events within a speculative processor comprising a plurality of counters, wherein each counter among said plurality of counters counts occurrences of specified events within the speculative processor, the system comprising:

first means for reading from a first counter a count of occurrences of a specified event for all instructions executed by the speculative processor;

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second means for reading from a second counter a count of occurrences of the specified event for instructions completely executed by the speculative processor; and

5 means for computing a difference between the count  
of occurrences of the specified event for all  
instructions and the count of occurrences of the  
specified event for all completed instructions as a count  
of occurrences of the specified event for instructions  
10 speculatively executed by the speculative processor.

16. A computer program product on a computer-readable medium for monitoring events within a data processing system comprising a speculative processor and a plurality of counters, wherein each counter among said plurality of counters counts occurrences of specified events within the data processing system, the computer-program product comprising:

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first instructions for specifying an event to be
20 monitored;

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second instructions for monitoring for the specified event during the execution of instructions by the speculative processor;

third instructions for generating a count of  
25 occurrences of the specified event for all instructions  
executed by the speculative processor; and

fourth instructions for generating a count of occurrences of the specified event for instructions completely executed by the speculative processor.

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17. A computer program product on a computer-readable

medium for computing a count of events within a speculative processor comprising a plurality of counters, wherein each counter among said plurality of counters counts occurrences of specified events within the speculative processor, the computer program product comprising:

10           second instructions for reading from a second  
counter a count of occurrences of the specified event for  
instructions completely executed by the speculative  
processor; and

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